

# Automatic Electricity Billing Using Power Line Communication

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**Abstract** - The automation is done in day today life for reducing work. So we are designed automatic electricity billing using power line communication. In this project we implementation of power line network in the field of electricity billing. It will easily implemented, like wise other methods. The advantage of this system is it eliminates need of employee's not only for taking readings but also to cut off the supply. This also reduces the time required and it is accurate. This system is fully automated and controlled. In this project automatically unit consumed and status are transferred to EB that means electricity billing office using power lines and number of units according tariff are also displayed on consumer side. The supply is automatically cut off if bill is not paid.

**Key Words** - Energy Meter, EB, PLM Module

## I. INTRODUCTION

Now a day's Electricity billing is very erroneous and time consuming. The energy meter readers go to every house and take a photo of meter. According to number of unit consumed, bill issued. This requires need for employing EB meter readers and long working hours for billing. In traditional and also in conventional system the meter readers goes to every consumer homes for taking reading it is very inconvenient. On duty employees faced some problems such as houses is found locked, this is embarrassment for the employee. Now a day's employ take a photo of meter sometime there is blur in photo hence all these lead to inaccurate billing. The disadvantages of system are blur in photo, easy manipulation, manual labour, time consume. If consumer is failed to paid bill in given period then employee must go to the customer's home and cut off the supply. Hence it causes waste of time and employee power. To avoid this we are design automated electricity billing using power line communication. In this project both the units and bill are displayed on customer side. This system provides effective and efficient wireless automatic power meter reading and billing using power line communication. The meter readings in the form of digital data are transferred from the customer meter to the EB office through power line. At regular time interval meter readings are collected and present reading is compared with previous reading and bill is made as per tariff. This bill is send to customer end from EB office using power lines and both consumed units and bill are displayed on LCD at the consumer server. The customers are provided with some period for the payment of bill. If customer fail's to pay bill, then supply is automatic cut-offed by the relay. Once the bill is paid the supply is restored back. Automatic tripping and restoring of supply is done in this system. Thus in this system there is no need of employee from the beginning of recording the meter reading to, till the supply control when the customers fail to bill. The advantages of system have less man power, quick updates, more accurate and cost effective. The power line communication used here is bidirectional. So there is no need of employee for taking the photo of meter reading. The automated EB billing procedure has an ability to fulfill the need of users.

1. The automated billing system is done.
2. Allow the user to get updated regarding to details of power used in his house.
3. Automatic supply tripping and restoring under the case of failure in paid the bill.
4. The new system readily adaptable and hence less time is consumed to implement this system.

## II. PRINCIPLE OPERATION

From the EB office each household is allocated a particular ID so that they can be uniquely identified hence there is no chance of manipulation in this system. The data transfer at faster rate through long distance. Sometimes power lines may be noisy at certain times due to interference. In such case data transmission may be disrupted. Hence microcontroller is used to enable data transmission even in nosiest power lines and also at any wheather condition.

The electricity consumption and automatic billing through the power line essentially consist of three sections:

1. Taking reading from digital meter by RS232 and send to microcontroller.
2. Protocol conversion from PLA to RS232.
3. Transmission of consumed energy unit through power line to EB side.

## III. SYSTEM DISCRPTION

- a. Customer side

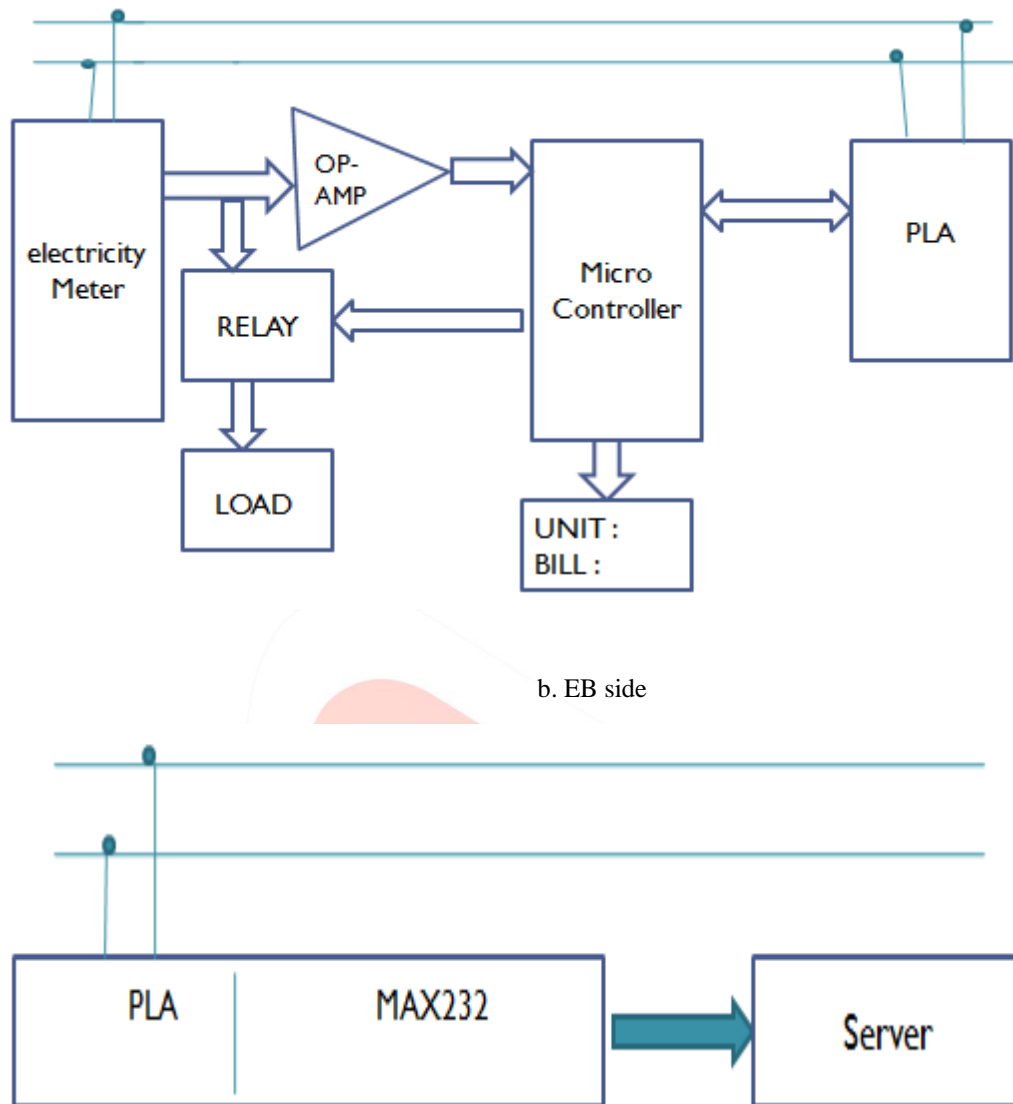


FIG.01.BLOCK DIAGRAM

In the first section the energy meter is used where the energy consumed by the consumer is calculated digitally. Then this reading's is given to the microcontroller directly through the RS232 protocol. The microcontroller have direct access to the RS232. For every 100 pulse the microcontroller receives it increase the number of units consumed by the consumer by 1. This data that is number of unit consumed are stored in EEPROM then it displayed on LCD. The PLM is connected to the microcontroller and power lines. The PLM is useful to send and receives serial data over existing AC power lines. This modem receives the input from the microcontroller and transmits it to the EB side PLM module. The PLM module in the EB side sends this data to the PC. As per the tariff software the bill is calculated and sends to the microcontroller through the same pair of PLM module. Hence the number of units consumed and the amount of consumed unit is displayed on the LCD.

#### IV. HARDWARE ORIENTATION

- **Power Supply** - In power supply unit consist of full wave rectifier circuit. The rectifier circuit is supported with the suitable filter circuit so as to ensure pure DC output. In this circuit using IC7805, we can get +5V DC supply.
- **AT89S52** - The AT89S52 is the heart of the system. It is 8 bit microcontroller with 8K bytes of in- system programmable flash memory. It is powerful microcontroller which provides a highly flexible and cost effective solution to many embedded control applications. It controls the LCD display, power line communication and the generate interrupts. The EEPROM memory is used to store the microcontroller.
- **Energy Meter** - The energy meter is an electrical measuring device, which is used to record electrical energy consumed over a specified period of time in terms of unit. We use the digital energy meter here where the energy consumed by the consumer is calculated digitally.
- **LCD Display[16\*2]** - LCD means liquid crystal device. This is basis 16 character by 2 line display. . This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. The LCD is used for display the information provided to it.

- **EEPROM Memory** - EEPROM (electrically erasable programmable read-only memory) is user-modifiable read-only memory that can be erased and reprogrammed repeatedly through the application of higher than electrical voltage.
- **POWER LINE MODEM** - Power line modem is useful to send and receive serial data over existing AC mains power lines of the building. It has high immunity to electrical noise persistence in the power line and built in error checking so it never gives out corrupt data. The modem is in form of a ready to use circuit module, which is capable of providing 9600 baud rate low rate bi-directional data communication. Due to its small size it can be integrated into and become part of the user's power line data communication system.



Fig 2 Power line midem

**V. SIMULATION RESULT**

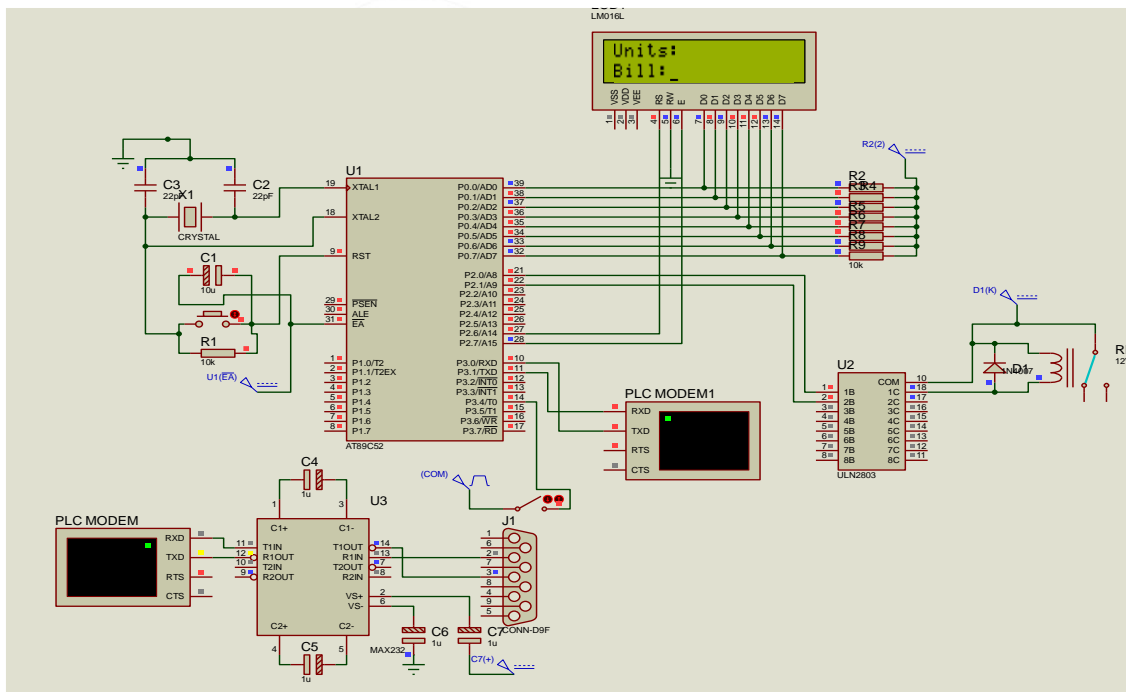


Fig 2 Simulation result

**VI. CONCLUSION**

The designing of electricity billing using power line communication is simulated successfully. In this system consumed unit are automatically sends to EB side using power lines. The consumed unit and billing are more accurately obtained and display on customer side as well as EB office. There is no need of employee to cut and restore back the supply, it is automatically done.

**VII. REFERENCES**

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